

APPENDIX A

PROJECT DESIGN & MITIGATION MEASURES AND MONITORING

The following is a description of the design and mitigation measures, coarse woody debris, snag and green tree retention guidelines that would be applied with Red Pines, Modified - Alternative E. Modifications between the FEIS and this ROD are displayed in **bold text**.

A.1 PROJECT DESIGN MEASURES

Project design measures are applied prior to and during activity implementation to reduce potential resource effects.

Forest Plan standards and other agency directions, along with information derived from monitoring past projects were used to identify mitigation measures applicable to the action alternatives. Mitigation measures are practices used during project implementation.

Table R-10 and Table R-11 outline the project design and mitigation measures. These lists are not all-inclusive, as the Forest Plan standards are incorporated by reference.

Design measures associated with the harvest, and road construction and reconstruction were developed to avoid or reduce potential resource impacts. Public comments were considered when developing these measures. The following measures and management requirements were designed to apply to all action alternatives. The sale preparation forester and the sale administrator would identify the specific conditions of the timber sale (Timber Sale Contract, Division A). Standard provisions (Timber Sale Contract, Division B) and any specific provisions (Timber Sale Contract, Division C) would also be applied.

Best Management Practices (BMPs) were used to plan this project. BMPs are the primary mechanism to enable the achievement of water quality standards to ensure compliance with the Clean Water Act of 1972, as amended (1977 and 1987) and Idaho State Water Quality Standards. BMPs are applied as a system of practices that are a preventative rather than an enforcement system. BMPs are a management and planning system in relation to sound water quality goals, including both broad policy and site-specific prescriptions and are designed to accommodate site-specific conditions. They are tailor-made to account for the complexity and physical and biological variability of the natural environment. As defined in the Idaho State Water Quality Standards (IDAPA 58.01.02), BMPs include the Idaho Forest Practices Act Rules (IDAPA 20.02.01) and Idaho Stream Alteration Rules (IDAPA 37.03.07). BMPs also include the USDA Forest Service Northern and Intermountain Region's Soil and Watershed Conservation Practices Handbook (USDA-FS 1988c; FSH 2509.25). BMPs are also derived from the Nez Perce National Forest Plan, as amended. BMPs specifically tailored to this project are defined below and would be included in contracts or other measures used to implement the project. Effectiveness of BMPs commonly used on the Nez Perce National Forest was described in Gerhardt, *et al*, 1991.

In addition, long-term watershed and/or fish habitat improvement projects are required in all the subwatersheds where harvest and road construction/reconstruction activities occur at levels considered to be an entry (as defined in Gerhardt, 1991b). These projects are connected actions and mitigation for specific existing conditions and past activities that have negatively impacted aquatic resources in the affected watersheds. They are designed to mitigate effects of harvest activities, such as increased sediment yield and road densities. Some of the watershed improvement projects are likely to have short-term negative impacts on aquatic resources during the implementation and post-project stabilization phases, and long-term positive impacts. The watershed improvement projects also have specific design criteria and BMPs to reduce the short-term impacts on fish habitat and water quality.

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Table R-10 Project Design Measures (changed from the FEIS to ROD are in **bold text**)

Item	Project Design Measure	Implementation Method	Effectiveness
FUEL REDUCTION ACTIVITIES			
1	No fuel reduction activities would occur in Inventoried Roadless Areas.	NEPA project design, silviculture prescription, and field prep.	High, based on past experience.
RIPARIAN HABITAT CONSERVATION AREAS			
4	No felling or removal of trees would be allowed in any streamside or wetland RHCAs; except at temporary road crossings, with restoration activities or to facilitate anchoring of cable yarding systems.	NEPA project design, silviculture prescription, field prep and contract admin.	Moderate, based on past experience.
5	Fuels would not be ignited within RHCA's, but fire may be allowed to back into these areas when fire severity would be low and burning would not result in extensive reduction of tree canopy cover or exposure of bare soil.	FS Fuels management	High, based on Research, PNW Lab, Starkey Project
6	Landslide prone areas are also considered Riparian Habitat Conservation Areas (RHCAs). No timber harvest or road construction would occur in areas of high landslide hazard. Timber harvest, road construction, or fuel reduction in areas of moderate landslide risk would be modified as needed to protect slope stability. If additional, unmapped landslide prone areas are found during project implementation, areas would be dropped or activities would be modified with watershed specialist oversight to protect slope stability.	NEPA project design, silviculture prescription, and field prep.	High, based on past experience.
OLD GROWTH			
7	Old Growth was surveyed in the planning area. Areas meeting Forest Plan Appendix N and North Idaho definitions were verified. Alternative E-Modified verifies MA 20 (old growth and replacement old growth; Map 15 - Appendix F of the ROD). No fuel reduction activities would occur in identified MA 20 . At least ten percent of forested areas would be set aside as MA 20 (old growth and replacement old growth) in Old Growth Analysis Areas (OGAA) or combinations of OGAA's within and adjacent to the project area.	NEPA project design, silviculture prescription, and field prep.	Moderate, based on past experience
SOILS, WATER QUALITY, AND FISH HABITAT			
8	During the final site-specific review, if any previously unidentified areas of detrimental soil disturbance from past human-caused disturbance are found, the planned activities in that unit would be modified or dropped. Ensure that cumulative impacts would not exceed Forest Plan soil quality standard number 2, as amended, upon completion of activities, and/or that a net improvement is established through restoration in that unit.	NEPA project design, silviculture prescription, and field prep.	Moderate, based on research and forest monitoring data.
9	Tractor harvest and/or excavator use would be limited to slopes less than 35 percent.	NEPA project design, silviculture prescription, and field prep.	High, based on past experience.
10	Fuel reduction activities would be coordinated with soil restoration activities for greatest efficiency.	Contract administration	High, based on past experience.

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Item	Project Design Measure	Implementation Method	Effectiveness
11	Broadcast burning would be applied in preference to excavator piling wherever practical to reduce soil damage.	NEPA project design, silviculture prescription, and contract.	High, to the degree implemented; based on forest monitoring data.
12	Temporary roads would be built, used, and decommissioned within a 1- to 3-year period, in order to reduce the amount of sediment production and impacts to wildlife . Decommission temporary roads during the same season as use, when possible .	NEPA project design and contract administration	Moderate, based on NEZSED modeling
13	New, temporary roads would be constructed using minimal road widths and out-sloped surface drainage.	Contract and contract administration/inspection	High, based on literature, San Dimas, Road/Water Interaction
14	Coarse woody debris greater than 3 inches diameter would be retained in fuel reduction units in amounts to meet guidelines in Table R-12 (Appendix A –ROD) . This would also comply with LCAS for lynx.	NEPA project design, silviculture prescription, contract, and contract administration.	High, based on research.
15	Retain green tops within units, where available. Site specific exceptions may be made based on a conference with soil, fuel, silviculture and contracting resource specialists.	NEPA project design, silviculture prescription, BD plan, and contract.	High to the degree implemented, based on research.
16	Winter harvesting would be allowed only during frozen conditions. Frozen conditions are defined as greater than 4 inches of frozen ground, a barrier of snow greater than two feet in depth (unpacked snow), or one foot in depth (settled snow).	Contract administration	Moderate, based on monitoring
17	Sediment and erosion control measures such as dewatering culverts, sediment barriers, rocking road surfaces and/or ditches, etc., would be used as needed when constructing, reconstructing, and decommissioning roads and stream/road crossing improvements, to protect fish habitat and water quality.	Contract and contract administration	High, based on literature, San Dimas, Road/Water Interaction
18	Activities in fish bearing streams would be allowed between July 1 and August 15 to avoid sediment deposition on emerging steelhead or Chinook redds. These dates may be site-specifically adjusted through coordination with Central Idaho Level I team review and approval.	NEPA project design, contract and contract administration/inspection	Moderate, based on past experience.
19	Stream crossing placements would provide for channel width, flow velocities, substrate condition, and stream gradients that approximate the natural channel and accommodate passage of streamflow, debris, fish, and other aquatic organisms. When designing new structures, consider and give preference to open-bottom arches, bridges and oversized culverts.	NEPA project design, contract and contract administration/inspection	High, based on literature, San Dimas, Road/Water Interaction
20	A Spill Prevention Control and Countermeasures Plan (40 CFR 112) would be prepared and implemented that incorporates the rules and requirements of the Idaho Forest Practices Act Section 60, Use of Chemicals and Petroleum Products; and US Department of Transportation rules for fuels haul and temporary storage; and additional direction as applicable.	Contract and contract administration/inspection	High, based on fact
21	During instream habitat improvement activities, tree felling in RHCA's would occur only where that activity would not affect Riparian Management Objectives for shade and wood debris recruitment.	Contract and contract administration/inspection	Moderate, based on past experience.
TRAILS/RECREATION			

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Item	Project Design Measure	Implementation Method	Effectiveness
22	Protect Trails 506 and 507 during soil restoration activities.	Contract and contract administration/inspection	High, based on past experience.
22a	Fix dispersed sites, put in toilets, provide spur roads to improve dispersed sites where needed near the "Narrows area".	NEPA project design and contract administration	Moderate, based on past experience.
23	Coordinate winter log hauling on roads used as groomed snowmobile routes to minimize conflicts.	NEPA project design and contract administration	Moderate, based on past experience.
24	Designate all system trails as Protected Improvements in the Timber Sale Contract. No skidding across trails, except at designated locations or over snow. F all trees away from trails, cut stumps less than 12 inches in height within 100 feet of trails, leave available regeneration within 100 feet of trails to create a visual buffer between treatment areas and trails. C onstruct firelines, as needed to protect the regeneration buffer and trail during slash treatment, and do not use trails as firelines.	NEPA project design and contract administration	Moderate, based on past experience.
AIR QUALITY			
25	Follow procedures outlined in the North Idaho Smoke Management Memorandum of Agreement, including restrictions imposed by the smoke management-monitoring unit.	FS fuels management	High, based on past experience.
26	Limit burning to times when wind patterns would cause smoke plumes to drift away from local populated areas.	FS fuels management	Moderate to high, based on past experience.
27	Conduct prescribed burning over several years to reduce the amount of smoke in any one year.	FS fuels management	High, based on past experience.
28	Consider additional restrictions, beyond those imposed by the smoke management-monitoring unit for prescribed burning, for local air quality reasons, including visual.	FS fuels management	High, based on past experience.
WILDLIFE			
29	Notify the unit biologist, should any of the following be sighted in the project area during project implementation: lynx or a lynx den, bald eagle, new wolf den or rendezvous site, active goshawk nest.	NEPA project design, silvicultural prescription, field prep, and contract administration.	Moderate, based on past experience.
30	Maintain the Pacific yew component in clumps where feasible and where it exists in fuel reduction units. MA21 moose/yew.	Field prep, NEPA project design, contracting and contract admin.	Moderate, based on past experience.
31	To the extent practical do not place, slash piles within patches of Pacific yew.	NEPA project design, silvicultural prescription, field prep, and contract administration.	Moderate, based on past experience.
32	Within MA 21, conduct fuel reduction only in areas less than 35 percent slope, where fuels can be treated without broadcast burning (Within Units #79, 80, 81, 116, 117; Forest Plan, page III-59). Maintain at least 50% of the live Pacific yew trees scattered throughout the unit in patches 1/4 to 1/2 acres in size.	NEPA project design, silvicultural prescription, and field prep.	Moderate, based on past experience.

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Item	Project Design Measure	Implementation Method	Effectiveness
33	Do not prescribe broadcast burning in MA 21, and do not slash Pacific yew except to provide room to machine pile.	NEPA project design, silvicultural prescription, and field prep.	Moderate, based on past experience.
34	Retain snags and snag replacement green trees in numbers consistent with Regional Guidelines (Tables R-13 & R-14 Appendix A- ROD). No large snags (>15"), other than lodgepole pine, would be removed. Retain all large ponderosa and western larch trees (> 21"). (Trees and snags which present a safety hazard may be removed).	Field preparation, NEPA project design, contracting and contract administration	Moderate, based on forest monitoring data
35	Evaluate trees with obvious large cavities or stick nests to determine if the trees should be retained or if other management actions need to occur. Retain all identified goshawk and ospreys' nests trees and associated perch trees.	NEPA project design, silvicultural prescription, field prep, and contract administration.	Moderate, based on past experience.
36	Coordinate timing of prescribed burning with the unit biologist, silviculturist and fuels management specialist to achieve objectives and reduce impacts to species during important reproductive and natal period, as well as other resources.	NEPA project design, silvicultural prescription, burn plans, field prep, and contract administration.	Moderate, based on past experience.
37	Maintain the integrity of existing public access management restrictions within the planning area for wildlife security purposes. Do not allow hunting or trapping of animals using motorized vehicles on a restricted road by any contractor or their representatives. No winter logging in moose and elk winter range (including MA 21). Elk Winter Range Units: 1, 9, 11, 12, 93, 94, 95, 97, 98, 99, 100, 131, 132, 133, 139, 141, 143, 144, 149, 154, 177, 178, 180, 181, 183. Moose Winter Range Units: 70, 79, 80, 81, 116, 117, 143.	Timber sale contract and administration	Moderate, based on past experience.
38	This design measure is included in Design Measure #12 and Mitigation Measure #L.	NEPA project design and contract administration	Moderate, based on past experience.
39	Apply the current access management restrictions to existing reconstructed roads after implementation of activities to maintain existing access and wildlife security.	NEPA project design and contract administration	Moderate, based on past experience.
40	Design riparian fencing to accommodate big game.	Unit Wildlife or Fisheries Biologist and contract administration	Moderate, based on past experience.
HERITAGE RESOURCES			
41	Avoid or protect known historic properties or sites.	NEPA project design, field prep, contract administration	High, objective to achieve a "no adverse effect" on these resources

NOXIOUS WEEDS AND TES PLANTS			
42	Apply Forest Service approved native plant species or non-native annual species to meet erosion control needs and other management objectives such as riparian restoration and wildlife habitat enhancement. Regional plant and seed transfer guidelines would be observed. Undesirable or invasive plants would not be used. Apply only certified weed-free seed and straw for these projects to reduce the introduction of weed species.	Contract and contract administration/inspection	High, based on experience and fact.
43	Candystick, a former USFS Region 1 sensitive plant species occurs in some proposed units. Protective measures, including leave tree clumps, would be used to protect a viable group of plants within proposed units 49, 50, 151, and 168, as determined by a unit botanist.	NEPA project design, field prep, contract administration	High based on past monitoring and experience.
44	All rock used for surfacing would be county-certified as free of noxious weed seed.	Contract and contract administration/inspection	Moderate, based on past experience.

A.2 PROJECT MITIGATION MEASURES

Forest Plan standards and agency direction, along with information derived from monitoring past projects were used to identify mitigation measures applicable to the action alternatives. Mitigation measures are practices used during implementation of the activities and are shown in R-11, below.

Table R-11 Project Mitigation Measures

Item	Mitigation Measures	Implementation Method	Effectiveness
SOILS, WATER QUALITY, AND FISH HABITAT			
A	For instream activities in fish-bearing streams that contain listed species, fish are expected to disperse from the project area. If it is determined necessary, additional measures would be used to ensure fish are not harmed or killed by instream activity. If electrofishing is necessary, it would be conducted in accordance with NOAA Fisheries electrofishing guidelines found at http://www.nwr.noaa.gov .	Contract and contract administration/inspection	Moderate, based on past experience.
B	Restrict fuel reduction, soils and watershed restoration activities when soils are wet, to prevent resource damage (rutting, displacement, erosion).	Contract and contract administration/inspection	High, based on research.
C	Locate and design skid trails, landings and yarding corridors prior to activities to minimize the area of detrimental soil effects. Space tractor skid trails 80 to 120 feet apart, except where converging on landings, to reduce the area of detrimental soil disturbance. This does not preclude the use of feller bunchers if soil impacts can remain within standards.	Contract and contract administration/inspection	High, based on research.
D	Minimize equipment trafficking, excessive piling, and redistribution of slash on excavator piled units. Numerous small piles are preferred over few large piles, to avoid nutrient loss and soil damage.	Contract and contract administration/inspection	Moderate, based on forest monitoring data.
E	Use cable systems with one-end or full suspension wherever possible to minimize soil disturbance.	Contract and contract administration/inspection	High, based on research and forest monitoring.

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Item	Mitigation Measures	Implementation Method	Effectiveness
F	Stockpile and replace topsoil on excavated landings after scarification as negotiated with contractor during implementation.	Contract and contract administration/inspection	Moderate to high, based on research.
G	Scarify and recontour excavated skid trails and excavated landings to restore slope hydrology and soil productivity except when restoration would compound negative impacts.	Contract and contract administration/inspection	Moderate, based on research.
H	Scarify non-excavated skid trails and landings compacted or entrenched 3 inches or more to a depth of 4 to 10 inches to restore soil permeability , as directed by contract administrator and working with forest soil scientist.	Contract and contract administration/inspection	Moderate to high, based on research.
I	Scatter slash over recontoured and scarified skid trails and landings, with a goal of achieving a minimum of 40% ground cover (half in larger material), where available and acceptable to fuel managers.	Contract and contract administration/inspection	High, based on research.
J	Retain areas of intact functioning riparian vegetation where possible during stream restoration work.	Contract administration	High, based on past experience.
K	Stabilize soil restoration areas using erosion barriers, mulch, slash as needed, and implemented concurrently as work is completed as negotiated under contract. No overwintering of incomplete soil restoration activities. Plant soil restoration areas in subsequent seasons as needed to establish adequate ground cover.	Contract administration	Moderate, based on past experience.
ACCESS/PUBLIC SAFETY			
L	Close temporary roads to public motorized use, except as specifically authorized Additional measures may be implemented to ensure access restriction. Close gates (with access restrictions) daily during non-operating hours on existing roads used for treatment during a restricted period.	Contract administration	Moderate for sediment reduction, based on monitoring
M	Require operator to set up warning signs advising of equipment operations or hazards for public safety.	Contract and contract administration/inspection	Moderate, based on past experience.
WILDLIFE			
N	Protect any active goshawk nest discovered within 450 feet of timber or fuel reduction activities, as well as a 30 acre no-treatment buffer area around the nest tree, as designated by the unit biologist to provide for foraging and nesting sites.	Field preparation, contract and contract administration/inspection	High, based on past experience.
FUEL REDUCTION ACTIVITIES			
O	Directional felling would be done to minimize breakage and damage to residual trees.	Field preparation, contract and contract administration/inspection	High, based on past experience.

HERITAGE RESOURCES			
P	Stop all work if any historic properties are discovered during implementation of activities (in compliance with 36 CFR 800.11).	Contract administration	Moderate, based on COR recognition of resource and contact with Heritage Personnel
Q	Halt all ground-disturbing activities if additional cultural resources are discovered during project operations, until such cultural materials can be properly documented and evaluated by the Forest Archaeologist (in compliance with 36 CFR 800).	Contract and contract administration/inspection	Moderate, based on COR recognition of resource and contact with Heritage Personnel
NOXIOUS WEEDS AND TES PLANTS			
R	Implement appropriate protection measures, if activities impact previously unknown sensitive plant occurrences. Appropriate measures would vary depending upon the ecology of the species involved and nature of the proposed action and be directed by a botanist.	Silviculture prescription, field preparation, and contract administration	High, based on monitoring, experience and logic.
S	Remove all mud, soil, and plant parts from all off road equipment before moving into project area to limit the spread of weeds. Cleaning must occur off National Forest lands. This does not apply to service vehicles that would stay on the roadway, traveling frequently in and out of the project area.	Contract and contract administration/inspection	Moderate to Low, based on logic and professional judgment.

A.3 COARSE WOODY DEBRIS, SNAG, AND GREEN TREE RETENTION GUIDELINES

COARSE WOODY DEBRIS

The recommendations in Table R-12 are based on the work of Graham et al., 1994, and Harvey et al., 1987. These guidelines assume that the more severe a disturbance affecting existing soil wood reserves, the more important it becomes to supplement the soil wood supply. Therefore, the recommendations change not only with habitat type, but also with severity of harvest treatment. Coarse woody debris includes material larger than 3 inches diameter, and distribution should be more or less scattered through the unit, with some localized concentrations acceptable, or even desirable for additional wildlife benefits. Low harvest severity is < 30 percent canopy removal, moderate is 30-<70 percent removal, and high is >=70 percent removal.

Table R-12: Recommended Coarse Woody Debris Prescriptions

Harvest or Fire Severity	Habitat Type Groups 1 and 2 Tons/Acre	Habitat Type Groups 3, 9, 10	Habitat Type Groups 4, 7, 8
Low: Low fire severity or harvest leaving slash onsite, no dozer piling or hot broadcast burn	5-10	10-15	15-20
Moderate: Moderate fire severity or harvest with moderate broadcast burn	10-15	15-20	20-25
High: High fire severity, or harvest yarding tops or hot broadcast burn, or dozer pile	15-20	20-25	25-30

SNAGS

The recommendations for snag and green tree retention are derived from the Northern Region snag management protocol (USDA FS, 2000). They are transposed from the VRU clusters used in that document to the habitat type groups (Applegate et al., 1995) and VRUs (USDA FS, 1998) used on the Nez Perce Forest. The data were taken from FIA plots, and modified with consideration for effects of fire suppression and exotic pathogens.

Snag occurrence is highly variable in the landscape, and densities of desirable snags have been highly reduced in the analysis area due to logging and fire suppression (USDA FS, 2003a). Snags provide both wildlife habitat and are recruited to coarse woody debris that sustains soil resources, so measures to improve both retention of adequate numbers and some measure of equitable distribution are justified. This means, particularly for areas that have lost desirable snags to the degree that the Red Pines area has, that snag retention and recruitment should be applied using the guidelines in Table R-13 on all stands where it is possible to do so.

Table R-13: Snag Retention Guidelines

Habitat Type Group/VRU	Snags 11.0-19.9 inches dbh per acre*	Snags ≥ 20.0 inches dbh per acre*	Total trees per acre	Total trees per 10 acres
Warm dry ponderosa pine and Douglas fir (HTG 1)		1-2	1-2	10-20
Cool Douglas-fir and warm grand fir (HTGs 2, 3, and 4/VRUs 3 and 4 – not lodgepole cover types)		4	4	40
Cool, wet and dry grand fir and subalpine fir (HTGs 3, 4, 7, 9 Not lodgepole cover types or VRU 3 or 4)	4-10	2	6-12	60-120
Cool, wet and dry grand fir and subalpine fir (HTGs 3, 4, 7, 9 - Lodgepole cover types, any VRU)	3-8	2-4 or as available	5-10	50-100
Low elevation cedar (HTGs 5, 6)	8	4	12	120
High elevation cold habitat types (HTGs 10,11)	All available	All available	All available	All available > 10 inches

*Where snags are not available in these classes, substitute green trees. Where neither green trees nor snags are available in these size classes, substitute the largest diameters available. Preferred species in order are ponderosa pine, larch, Douglas fir, grand fir, lodgepole pine, spruce.

GREEN TREE SNAG REPLACEMENT

Protecting existing large diameter snags would not assure long-term snag occurrence on National Forest lands. Managing live trees for long-term snag recruitment is as important as protecting existing snags (Thomas et al., 1979, Hichcox, 1996). Current Nez Perce Forest Plan green tree replacement standards call for 4 trees per acre to be retained to provide large old trees to become snags in the future. Monitoring has shown these trees are likely to be lost to other causes before becoming available as snags. Causes of loss include wind throw, salvage, falling for safety concerns, or slash burning (Steve Blair, personal communication.). Therefore, the recommendations are greater than the Forest Plan's.

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The Regional Protocol recommends using SnagPop, a matrix model of tree survivorship and fall rates. This requires site-specific data lacking for many project areas. The recommendations below consider the work of Schommer et al. 1993, and Ritter and Davis, 1994, and the snag guidelines from the Payette National Forest (USDA Forest Service 1995). They are adapted to the same habitat type groups/VRU groups as in the snag recommendations above. They must be considered provisional and need more rigorous modeling and monitoring to evaluate their adequacy.

Densities of desirable replacement large green trees have been highly reduced in the analysis area due to logging (USDA FS, 2003a). Many harvest units have been clearcut and dozer piled so that no recruitable snags, green trees, or woody debris exist. One purpose of these guidelines is to assure that some green trees are available for snag and down wood recruitment in the future.

Leave trees should represent the range of species and size classes most likely to survive natural fire disturbance, and be located in the clustering patterns and locations most likely to have survived natural fires in the local setting (e.g. open ridges or rocky areas), and be likely to survive harvesting operations and post-harvest exposure.

The rationale for this guide may be less than the 4-6 green tree replacements per snag recommended by Ritter and Davis (1994) for the Clearwater, because the snag recommendations of the Regional Protocols presented in Table R-14 significantly exceed those recommended in the Clearwater guidelines. The recommendations here are based on:

- 1) An equivalent number of large green retention trees as snags
- 2) Recommendations for smaller diameter green trees are estimated as twice the number of smaller diameter snags, or twice the numbers of larger snags if no small snags were recommended. This is to provide for variable growth, mortality, and soil wood recruitment over time. These numbers should be more rigorously evaluated before widespread adoption.

Table R-14: Green Tree Snag-Replacement Guidelines

Cover Type	Trees/Acre 11-19.9 in. dbh	Trees/Acre ≥ 20 inches dbh	Total green trees/Acre	Total Trees/ 10 Acres
Warm dry ponderosa pine and Douglas fir (HTG 1)	4	2	6	60
Grand fir and Cool Douglas fir (HTG 2, 3, 4/VRUs 3 and 4, - not lodgepole cover types)	8	4	12	120
Cool, wet and dry grand fir and subalpine fir, other VRUs (HTGs 3, 4, 7, 8, 9 – not lodgepole pine cover types or VRUs 3 or 4)	14	2	15	150
Low elevation cedar (HTGs 5, 6)	16	4	16	160
Cool, wet and dry grand fir and subalpine fir (HTG 3, 4, 7, 9 - Lodgepole cover types, any VRUs)	12	3 or as available	15	150
High elevation cold habitat types (HTGs 10,11)	Inadequate data	Inadequate data	Inadequate data	Inadequate data

Scale at which to apply snag and snag recruitment prescriptions

Snag retention and recruitment prescriptions should be applied, where possible, at the stand scale. Success of snag retention and recruitment may be monitored at the subwatershed scale or larger.

Clumping of snags and retention green trees is acceptable and even desirable for wildlife, in 1-2 acre patches within the unit, where necessary to provide for safety, operability, and long-term retention of leave trees. At the same time, try to ensure that each 3-4 acres is not without a snag. Green tree replacements and snags in clumps are desirable for nesting birds (Raphael and Morrison, 1984).

Look for natural clumps of snags or for areas where snags and green trees can be most logically maintained through logging and slash treatments.

Operational Considerations in Snag and Green Tree Retention

Not all snags are a grave significant danger and not all snags are of such high value that they should be retained where any safety risk is identified. The decision to cut or leave a snag would be made by the purchaser/operator, using the guide “Risk assessment for identifying reserve trees” that is available from each sale administrator.

Machine harvesting systems with cabs provide more safety than where fallers are exposed to falling trees, so more leeway for leaving trees should be possible where mechanized harvesting and piling are used.

In marking leave trees, attempt to avoid likely landing sites, roads, cable corridors, and within 1.5 tree lengths of the outer unit boundary on broadcast burn units. Snags and green trees would be lost.

Do not mark snags for retention within 300 feet of a road that would be open for firewood cutting unless they can be protected or unless they would not count toward the retention requirement.

Where one particularly desirable and safe snag or green tree is left in isolation on tractor units being machine piled, it should be feasible and economical to retain 20-50 feet of some brush and a few small saplings or poles around this tree to mitigate its isolation. This may not be feasible in broadcast burn units.

A.4 MONITORING PLAN

Monitoring is a process of gathering information through observation and measurement to assure the goals, objectives and standards of the Nez Perce Forest Plan are implemented and to ensure implementation and effectiveness of design criteria or mitigation. **Bold text** indicates changes.

Two forms of monitoring are proposed: 1) implementation and 2) effectiveness. These two types of monitoring are described below:

- Implementation monitoring is used to determine if management practices are implemented as planned in the Plan (Nez Perce Forest Plan and/or this EIS).
- Effectiveness monitoring is used to determine if management practices, as designed and executed, are effective in meeting project objectives, as well as goals, objectives, and standards of the Plan (Nez Perce Forest Plan).

An annual report would document accomplishments, monitoring results and the planned accomplishments for the next year.

Implementation monitoring of the following design criteria and mitigation measures would be conducted with all action alternatives on a sample basis. Monitoring would be accomplished by an interdisciplinary and/or multi-party team through a combination of any of the following methods:

- Review contract specifications
- Review designs and plans of operation
- Review contract administration reports (daily diaries)
- Review activities on the ground before, during and after implementation.

Implementation of the following design criteria and mitigation measures, as listed in this Appendix, would be monitored. Numbers and letters in parentheses correspond to those in Tables R-10 and R-11.

- a. Road Decommissioning: (12, 17)
- b. Temporary Road Construction and Road Reconditioning: (2, 12, 13, 17, 19, 44)
- c. Culvert Replacement: (18, 19, 21)
- d. Conversion of Roads to Trails: (24)
- e. Fuel Haul, Storage and Spill Containment: (20)
- f. Transport: (20, M)
- g. Storage and Transfer: (20)
- h. Spill Containment: (20)
- i. Prescribed Fire and Smoke Management: (5, 25, 26, 27, 28)
- j. Timber Harvest: (1, 2, 3, 4, 5)
- k. Sensitive Plants and Exotic Vegetation Management: (42, 43, 44, R, S)
- l. Soil Resource Protection: (8, 9, 10, 11, 12, 13, 14, 15, 17, C, D, E, F, G, K)
 1. Site-specific review prior to implementation for landslides or prior harvest impacts; with consequent adjustment of harvest or compensatory restoration as needed. Scientist with layout crew.
 2. Monitoring during project implementation:
 - a. Monitor progress toward compliance with soil quality standards (as amended), to identify activities, settings, or operating conditions that result in a trend toward non-compliance. Adjust activities to achieve compliance or identify additional required restoration activities. Contract administrator and soil scientist.
 - b. Monitor coordination of timber harvest and local soil restoration activities, including areas of prior impacts. Contract administrator.
 - c. Monitor that soil restoration is being done as recommended, including scarification, recontouring, addition of slash, litter or other organic matter, seeding and coordination with road decommissioning or harvest as appropriate. Contract administrator and soil scientist.
- m. Stream Restoration: (17, 18, 19, 21, A, B, J)
- n. Snags: (34, O)
- o. Access management: (28, 37, 28, 39, 40, L, M)
- p. Wildlife: (29, 30, 31, 32, 33, 35, 36, N)
- q. Heritage Resources: (41, 42, 43, P, Q)
- r. Recreational Activities: (22, 23, 24)

Effectiveness monitoring to determine if design criteria achieve their objectives. Effectiveness of the following design criteria would be monitored. Numbers in parentheses corresponds to those in the Table R-11, in this Appendix A of the ROD. Effectiveness monitoring would also be used to determine if treatments help meet goals and objectives, as described in Chapters I and II of the FEIS. Effectiveness monitoring would be accomplished using established protocols specific to each criterion, issue or indicator.

- a. Road Decommissioning: (12, 17). Report findings in forest monitoring report.
 1. Effectiveness of road decommissioning and soil restoration to reduce erosion sources. Identify sample monitoring sites and before and after photos and characterization.
 2. Effectiveness of road decommissioning to recover native vegetation: Vegetation frequency and cover plots 3 years after decommissioning.
- b. Temporary Road Construction and Road Reconditioning: (2, 12, 13, 17, 19, 44)
- c. Effectiveness of soil restoration to improve permeability on decompacted sites: Permeability or resistance measurements on compacted and decompacted sites. Report findings in forest monitoring report.
- d. Monitor compliance with snag/green tree and down wood retention guidelines upon completion of activities. Use accepted common stand exam protocols, including down wood in 10 randomly selected units. Sapling would be after fuels treatment. Soil scientist.
- e. Culvert Replacement: (18, 19, 21), including turbidity monitoring.
- f. Conversion of Roads to Trails: (24)
- g. Effectiveness of road-stream crossing removed (12, 17, 19), including turbidity monitoring.
- h. Prescribed Fire and Smoke Management: (5, 25, 26, 27, 28). Effectiveness of prescribed fire to achieve desired stand density, amount of fuels reduction and reduction in fire risk.
- i. Timber Harvest: (1, 2, 3, 4, 5).
 1. Effectiveness of timber harvest to achieve desired stand density, size class and species mix, cover types and canopy layers.
 2. Monitor compliance with soil quality standards upon completion of activities: using R6 protocols on a random 10 percent sample of tractor logging units. Soil scientist.
- j. Sensitive Plants and Exotic Vegetation Management: (42, 43, 44). Effectiveness of exotic species management to reduce exotic species populations and eradicate new populations.
- k. Wildlife: (29, 30, 21, 32, 33, 35, 36, 42, 43, 44)
- l. Recreation. Effectiveness of trail reconstruction and conversion of roads to trails to achieve recreation needs.
- m. Stream Restoration. Effectiveness of stream restoration activities to restore fish habitat elements, especially for the Red River Narrows project, including turbidity monitoring.

The forest has completed consultation with the NOAA-Fisheries and the Fish & Wildlife Service on the Red Pines project. Biological Opinions and concurrence I have received have additional monitoring. The required monitoring would be added to monitoring plans for the Red Pines project (See Appendix B of the ROD).

Forest Plan Monitoring

As part of implementing the Nez Perce Forest Plan the Nez Perce Forest monitors a multitude of effects and conditions within the Forest. The Forest Plan Monitoring items are displayed on pages V-4 through 8 and Appendix O of the Nez Perce Forest Plan. These monitoring activities are applied on a sample basis randomly across the Forest or among projects. Some of that monitoring may occur within the Red Pines analysis area. Forest Plan monitoring is reported in an annual monitoring and evaluation report.

Other Ongoing Monitoring

This section summarizes some of the ongoing monitoring that would be used to adjust implementation in response to monitoring findings, where modification would better meet objectives of design criteria or Forest Plan standards. These monitoring activities are not required as part of Alternative E-Modified of the Red Pines project but is displayed here for information.

Heritage Monitoring

Monitoring: Where pre-burning activities have been performed (e.g. fuels reduction, hand line construction and back burning, wrapping) and in specific cases in other types of treatment areas such as salvage or thinning units, monitoring of resource conditions may be required during and/or after project implementation. A qualified archaeologist would monitor resource conditions and in the case of burn units, fire personnel would be pre-positioned in strategic locations to protect the resource.

Data Recovery: If project activities are such that none of the above forms of mitigation can be performed for a significant site, and no acceptable alternatives exist, then data recovery would be required to protect and document the site. Data recovery or documentation may take the form of archaeological excavation and removal of the resource, documentation of historic structures meeting current professional standards such as HABS/HAER, or some other form of highly intensive documentation may be needed. Data recovery is a mitigation measure of last resort and is often time consuming, expensive, and ultimately removes the historic resource from its primary context.

Post-burn Survey: In those areas where there are sites that may benefit from a cool burning, relatively fast moving fire, and/or where long burning, high energy fuels have been removed or not are present, post fire survey would be recommended to reassess conditions and NRHP eligibility of the resource. Post-burn survey would also allow for the locating and documentation of new features or artifacts previously obscured by surface vegetation.

Aquatic Monitoring

Forest Plan trend data on fish habitat and channel morphology have been collected at three long-term monitoring sites in the Red River Watershed. Two of these sites are located in upper Red River and one is in Trapper Creek. The upper Red River sites would not be affected by this project. There are timber harvest, road reconditioning and road decommissioning activities planned under this project above the Trapper Creek site. Plans are to continue this instream monitoring.

Stream gaging stations are in place on upper Red River, South Fork Red River and Trapper Creek. Sampling at these gages includes streamflow, suspended sediment, bedload sediment, conductivity, and water temperature. There are a full range of activities planned under this project above the South Fork Red River site and timber harvest, road reconditioning and road decommissioning above the Trapper Creek site. Current plans are to continue monitoring at all three sites, though Trapper Creek may be considered for discontinuance once existing data have been fully analyzed.

University of Idaho maintains stream channel monitoring sites within the Red River Wildlife Management Area **along Red River. Parameters include: stream morphology, sediment size, cobble embeddedness and various other physical parameters.** Current plans are to continue monitoring at these sites.

The BLM Cottonwood Office has established and monitored an instream site near the mouth of Red River (River Mile 0.1) since 1993 (*most downstream point*). The Nez Perce National Forest would coordinate with the BLM in terms of continuation of this site and utilization of the data. Monitoring protocols in place at this site include substrate sediment composition and water temperature. Stream discharge and sediment yield are not measured at this site.

There are current efforts to complete monitoring on the main South Fork Clearwater River in relation to the TMDL. The TMDL Technical Advisory Committee is currently developing the plans.

Noxious and Exotic Species Monitoring

Survey managed areas after treatment and implement control measures to minimize expansion of noxious and exotic vegetation as prioritized by the overall forest weed program. These measures may include mechanical, chemical or biological methods.

Through implementation of the Clearwater Basin Weed Management strategy several elements are monitored throughout the Clearwater Basin, including the South Fork Clearwater River and Red Pines analysis area. Monitoring focuses on spread or suppression of weeds, and effectiveness of bio-control and herbicide treatments. This monitoring is detailed in Appendix I of the Clearwater Weed Management strategy.

Prescribed Fire Monitoring

The Programmatic Biological Assessment for the Fire Management Program (South Fork Clearwater River Biological Assessment, 1999 p. 97) specifies monitoring items for the prescribed fire program. These monitoring items include items such as location and size, mortality levels and patch size, and riparian fire intensity. This monitoring occurs for all fire activities occurring under this Biological Assessment including the on-going prescribed burning. This monitoring would continue and would also be applicable to prescribed fire activities proposed with this project.

Wolf Recovery Monitoring

Monitoring of wolf recovery is conducted by the Nez Perce Tribe Wolf Program. Recovery continues and wolf numbers continuing growing. Currently, there are 5 wolf packs that overlap or are in close proximity to the project analysis area.

Landbird Population Monitoring

In 1993, a USFS Region wide Landbird Monitoring Program was initiated. Sample plots were established along transects distributed across all 13 national forests of Region 1. Monitoring of neotropical migrant songbird species diversity and populations is currently being done in partnership with nongame biologists of the Idaho Department of Fish & Game and overseen by researchers from the University of Montana. (Hutto, R.L. and Young, J.S., 1999)

Vegetation Monitoring

Per the Forest Plan Chapter V table V-1 and Appendix O Item 4: Review of silvicultural practices and prescriptions written for these practices. Specific items include size of openings created by timber harvest, amount and success of reforestation activities, and correlation between the practices described in the prescriptions and on-the-ground implementation.

Interdisciplinary reviews of timber sales would review the prescriptions to ensure that goals and objectives of the Forest Plan are being met through the vegetation manipulation practices.

Mark trees during implementation. Tree stocking surveys, first, third and fifth year after regeneration harvest (clearcut) to evaluate reforestation activities.

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